



invent

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### General Information

**Title** Inkjet Recording Materials with High Image Quality and Performace

**Abstract** This invention describes the composition and construction of a inkjet recording materials. The inkjet recording materials of this invention has superior color gamut, Kod, humid bleed and humid fastness.

**Projects** Vegas

**Products** Everyday Photo Glossy Paper



### Attachments

**Attachments** Vegas\_2\_Trial\_Formulations.xls - [REDACTED] four scale-up formulations for Zanders (Uploaded by Tienteh Chen)  
 vegas\_data.xls - [REDACTED] Vegas Weekly Photoscreening (Uploaded by Tienteh Chen)



### Inventor Information

#### Inventors

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## Description of Invention

### Problems Solved

1. color gamma
2. Kod
3. light fastness
4. humid bleed
5. humid color shift

### Prior Solutions

1. use photo based paper instead of paper based paper
2. high coatweight (>25 GSM) on photo based paper to absorb ink vehicle
3. multipayer coatings to separate dye from ink vehicle and to improve coalescence
4. using mixtures of different water soluble polymers to achieve necessary IQ, et.al

### Description

The heart of this invention is the combination of very thin layer of polymeric or swellable ink receiving layer on a commercial off set and cast coated paper. Neither the composition nor the paper base used in this invention is new but the combination is novel. The main components of the ink receiving layer are (1) mixtures of two polyvinyl alcohols with 80 to 88% hydrolysis for optimum coalescence (2) boric acid as crosslinker to improve wet smudge and dry to touch (3) polysiloxane-polyethyleneoxide surfactant (Trade name Silwet) to reduce haze and mottle problem and (4) aluminum salts (aluminum chloride, aluminum formate) or poly(DADMAC) as mordants (5) cationic superfine colloidal silica (e.g. Ludox CL) to enhance Kod. The paper base used in this invention are coated paper (calendered or uncalendered) or cast coated paper.

### Advantages

Advantages of this invention are:

- 1) much lower coatweight than the high quality inkjet paper based on resin coated paper (swellable or porous). Usually 3-5 GSM is enough.
- 2) single layer coating
- 3) color gamut is superior to any other swellable or porous inkjet paper
- 4) black density (Kod) is higher than other swellable or porous inkjet paper
- 5) humid bleed and humid color shift are much better than media based on photo based paper
- 6) light fastness is comparable to the media cost much higher



## Invention History

**Published** No

**Announced** No - 5/1/03 - The name of this program is "Vegas". This product intended to replace Metro and would be named "the Glossy Everyday Photo Paper". The product plan to be released Spring of 2003.

**Disclosed** No

**Next Three Months** Yes

**Described** Yes - Described in notebook 2645-187 and 188 on July 11/2002. First described the evaluation of formulations for Vegas project.

**Built** Yes - 7/11/02

**Government Contract** No

**Related Disclosure** No

**Innovation Workshop** No



## Witnesses

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#### Classification

**Recommended Classification** IPG: Marking Materials/Media

**Legal Techword** media coatings - non-porous - -

**Keywords** inkjet media, swellable media, everyday photo paper, color gamut, polyvinylalcohol, aluminum formate, aluminum triformate, ludox CL, high gloss and Silwet surfactant



#### Administrative Record

**Date Submitted** October 16, 2002 11:48AM

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**PD Number** 200209928

**Date Received by Legal** October 27, 2002

	Rev. 1a	Rev. 1b	Rev. 1c	Rev. 1d	5	6	7	8	9
	60	60	60	60					
	40	40	40	40					
	0	0	1	5					
ormate	2	2	0	0					
	2	2	2	2					
	10	10	10	10					
	0.0%	0.5%	0.5%	0.5%					



				1	%
					grams

[illegible]

# Photo Screening Dashboard

Thom Brown

10/27/200

Week 23

Wee	
Sample	
Labe	
Projec	
Raw data link	

DJ970C/Chinook file=ispunge2prem:phstbst#970/or/spunge2phstbst#970
Ink=Chinook 651
Firmware=6
Image Quality
Coalescence - (rank 1-5
DOI
Gamut CIE Lab Volumes
Gamut Munsell Volumes
Gloss/Haze Uniformity
Gloss - Averag
Gloss - Std Dev
Gloss - Min
Gloss - Max
Gloss - Unimage - min
Gloss - min colo
L* min
Kod
Permanenc
Humid Bleed (mils) worst colo
Humid Bleed (mils) k halo
Humid Bleed (u) worst colo
Humid Bleed (u) k halo
Humid Color Shift - (AE94) avg 10 gray
Lightfade Fadeometer Glass
Pure cyan
Pure magent
Pure yellow
Failure Mode
Years to fail for Failure Mode
AE1E-2 wee
Pure cyan
Pure magent
Pure yellow
AE1E-4 wee
Pure cyan



Pure magent
Pure yellow
Waterdripfastnes
Wet Smudg

Malibu, Pele/Iris file = sponge2prem+phtobst.vip or sponge2photglsbst.vip
Ink = pele / iris
Firmwar
Porous Media Print Mode?
Dry to Touch
Image Quality
Coalescence - (rank 1-5
DOI
Gamut CIELab Volumes
Gamut Munsell Volumes
Gloss/Haze Uniformity
Gloss - Averag
Gloss - Std Dev
Gloss - Min
Gloss - Max
Gloss - Unimage - min
Gloss - min colo
L* min
Kod
Permanenc
Humid Bleed (mils) worst color
Humid Bleed (mils) Khalo
Humid Bleed (µ) worst color
Humid Bleed (µ) Khalo
Humid Color Shift (ΔE94) (avg 10) gray
Lightfade Fadeometer Glass
Pure cyan
Pure magent
Pure yellow
Failure Mode
Years to fail for Failure Mode
AF1/32 wee
Pure cyan
Pure magent
Pure yellow
AF1/34 wee
Pure cyan
Pure magent
Pure yellow
Waterdripfastnes
Wet Smudg



137	67	409	346	229	278	253	383	120
2.	4.	1.	1.	1.	2.	2.	2.	3.

4.0	5.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
4.5	4.5	4.5	4.0	3.5	4.5	4.0	4.0	4.3
32	33	11	10	10	12	11	15	42
442358	405448	459408	463741	433217	459512	472376	473666	432265
1693	1560	1754	1770	1660	1754	1801	1805	1657
Average	Good	Good	Good	Good	Good	Good	Good	Average
35	33	11	12	11	17	16	20	37
9	8	1	2	2	3	3	4	8
25	25	10	9	9	11	11	13	31
53	49	13	14	13	19	19	26	55
28	1	3	3	4	6	8	4	24
Cyan 50% Black 100	Cyan 100	Cyan 100	Black 100	Black 100	Magenta 1	Cyan 50%	Cyan 50%	Cyan 50%
3.8	9.6	2.6	2.4	5.1	3.2	2.2	2.2	4.0
2.43	2.01	2.60	2.58	2.28	2.65	2.71	2.78	2.43
7	13	4	6	5	4	5	5	5
4	10	3	3	3	3	3	3	3
168	325	112	150	135	112	114	130	124
89	246	64	74	71	71	66	79	79
3.5	4.6	2.6	3.0	3.9	3.0	2.8	4.3	5.6
								83.0
								234.8
								70.9
								Dhue (R-B
								27.8
116	53	375	254	302	173	241	207	100
2.	4.	2.	2.	2.	2.	2.	2.	3.

[illegible]

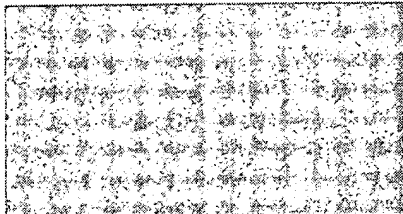
							0.2	47.8
							2.9	19.2
62	280	306	370	187	175	135	120	73
4.	2.	2.	2.	2.	2.	3.	3.	4.
5.0	3.5	3.0	3.5	3.0	3.5	3.5	4.0	5.0
4.5	4.3	4.3	4.3	4.0	4.5	4.3	4.3	4.5
32	5	8	12	11	10	10	42	36
402598	458519	459074	475840	448747	452918	467350	426659	400654
1550	1751	1753	1813	1716	1731	1783	1636	1543
Good	Good	Good	Good	Good	Good	Good	Average	Good
32	7	11	16	11	11	13	38	33
7	1	2	3	1	1	2	9	7
24	5	8	11	10	9	9	31	26
47	8	13	20	13	12	15	56	48
4	3	3	4	1	2	6	25	3
Black 100	Black 100	Black 100	Black 100	Black 100	Black 100	Black 100	Cyan 50% Black 100	
9.5	2.5	2.7	1.5	2.0	3.3	1.5	4.3	9.7
2.01	2.71	2.59	2.93	2.75	2.49	2.89	2.40	1.99
10	6	7	6	5	5	5	7	13
7	3	3	3	3	2	3	4	10
251	145	188	145	137	114	124	170	325
188	76	74	84	76	61	79	97	249
6.0	5.6	5.2	6.0	4.0	4.1	5.2	5.8	5.5
66.2	1000.0	1000.0	1000.0	1000.0	1000.0	116.6	97.4	34.9
78.1	272.0	69.9	671.6	78.4	32.6	21.1	234.8	47.9
7.6	1000.0	1000.0	1000.0	1000.0	1000.0	34.1	49.9	6.3
Neutral Dh	D(B) in D	D(B) in D	D(B) in D	D(B) in D	D(B) in D	D(B) in D	Dhue (R-B Neutral Dh	
5.4	12.9	11.2	10.9	9.0	8.8	9.4	27.8	5.1
							0.8	27.5
							0.0	44.1
							2.9	18.8
							2.7	38.1
							0.4	63.6
							2.5	21.1
52	172	142	206	127	211	133	114	166
4.	3.	2.	3.	2.	3.	2.	2.	4.

	Week 3							Week 38
Jet Print PRO	TT 2645- 39-4	AS 2605- 87 2	AS 2605- 87 3	AS 2605- 87 5	AS 2605- 87 6	Archie SU2 66D1 Control	Cabo	TT2645-2
02-36-0 Photo	02-36-0 Vega	02-36-0 Vega	02-36-0 Vega	02-36-0 Vega	02-36-0 Vega	02-38-0 Photo	02-38-0 Photo	02-38-1 VEGAS

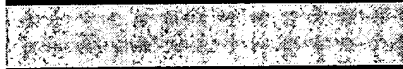
5.0	4.0	4.0	3.0	3.0	4.0	3.0	5.0	4.0
4.3	4.0	3.5	3.5	3.0	3.5	4.0	4.5	4.0
28	14	13	12	10	11	34	28	15
386724	500946	456949	456686	450031	456752	438073	405554	490457
1493	1903	1745	1744	1720	1744	1677	1561	1865
Good	Good	Good	Good	Good	Good	Average	Good	Good
17	16	14	13	13	11	35	31	19
5	4	1	2	2	1	9	8	3
14	13	12	11	9	10	25	22	13
26	21	16	17	15	13	53	47	21
0	8	2	6	5	4	28	7	7
Unimaged Black	50% Black	100% Black	100% Black	100% Cyan	100% Cyan	100% Cyan	100% Black	100% Black
16.9	2.5	4.3	4.3	5.2	4.8	6.9	9.1	1.6
1.73	2.71	2.43	2.43	2.37	2.37	2.24	2.03	2.89
30	7	6	6	7	7	7	14	7
15	5	3	3	2	2	5	11	3
762	183	150	157	165	165	183	356	168
384	130	71	66	56	58	122	277	86
4.4	4.4	4.7	4.2	3.3	3.1	4.2	11.9	12.4
2.4	10.5	12.9	8.1	9.0	12.2			
2.3	39.2	18.3	7.4	43.7	1000.0			
6.0	130.8	52.4	20.8	1000.0	1000.0			
Magenta i	Magenta i	Cyan in N	Neutral Dh	Pure Cyan	Pure Cyan			
1.9	9.3	11.4	6.7	9.0	12.2			
25.8	0.4	1.2	1.0	0.2	0.4			
43.4	0.2	0.8	0.6	0.5	1.2			
13.1	0.2	3.3	3.8	3.3	4.2			
53.3	2.4	1.4	1.3	0.8	0.6			



60.4	2.7	0.4	0.4	0.9	0.4			
22.3	0.6	3.9	3.1	2.3	4.2			
50	204	202	260	253	212	226	68	175
4.	2.	2.	2.	2.	2.	3.	4.	3.
5.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	4.0
4.5	4.3	4.0	4.0	3.0	4.0	4.3	4.5	4.0
39	17	10	9	11	11	40	31	6
404328	487774	460172	458309	457367	460124	442411	388710	463925
1556	1856	1757	1750	1747	1757	1693	1500	1770
> unimage	Good	Good	Good	Good	Good	Average	Good	Average
19	21	13	12	11	12	36	28	20
3	3	2	1	1	1	7	2	6
14	15	10	9	10	10	30	24	6
24	24	15	13	14	13	52	29	24
0	6	5	4	4	3	22	4	18
Unimaged Cyan 50% Black 100 Black 100 Black 100 Magenta 1	Cyan 50% Black 100 Black 100	Black 100 Black 100	Black 100 Black 100	Black 100 Black 100	Magenta 1	Cyan 50% Black 100 Black 100	Black 100 Black 100	Black 100
10.3	1.7	2.4	2.3	2.6	2.1	3.6	14.6	7.0
2.00	2.88	2.67	2.66	2.66	2.74	2.48	1.81	2.12
17	7	5	5	4	5	7	12	6
6	5	3	3	3	3	4	9	4
432	178	122	117	112	119	165	310	147
142	114	79	79	69	71	91	234	89
4.6	4.9	4.3	3.3	4.2	4.2	5.5	5.6	8.0
8.6	59.5	113.2	38.4	1000.0	1000.0			
10.6	32.4	41.4	35.4	1000.0	1000.0			
6.4	43.5	52.5	32.6	1000.0	1000.0			
Pure Yello Neutral Dh Yellow in Yellow in D(B) in D D(B) in Dmin								
6.4	12.4	10.1	7.4	12.3	13.6			
34.0	12.8	2.1	2.7	1.4	1.8			
45.2	12.1	3.0	2.9	2.3	2.1			
16.2	1.4	2.0	3.1	4.4	3.9			
48.6	15.8	2.5	2.9	2.0	2.5			
67.7	14.5	4.4	4.3	2.6	3.5			
23.8	2.1	2.8	3.3	3.6	3.9			
50	203	177	319	188	123	122	75	297
4.	2.	2.	3.	2.	2.	3.	4.	3.



TT2645-3	TT2645-4	TT2645-5
02-38-1	02-38-1	02-38-1
VEGAS	VEGAS	VEGAS



4.0	3.0	3.0
3.7	3.5	3.5
17	10	16
499934	465387	487247
1900	1775	1854
Good	Good	Good
21	14	16
4	2	2
15	10	14
26	17	19
9	8	5
lack 100%	lack 100%	lack 100%
1.3	4.6	2.3
3.03	2.31	2.66
8	7	8
4	3	3
196	175	198
104	71	81
13.6	11.5	11.5



224	208	267
3.	3.	3.
4.0	4.0	3.0
3.5	3.5	3.5
7	8	10
505927	476961	497733
1921	1817	1892
Average	Average	Average
15	15	20
4	4	5
7	7	9
18	19	24
10	12	15
Black 100	Black 100	Magenta 100%
3.9	7.1	3.1
2.65	2.12	2.50
7	6	6
5	3	3
175	140	152
122	69	71
7.9	7.7	8.7
205	287	212
2.	3.	3.

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